

CLAIMS:

1. A fractal generation process, including:
 - (i) randomly selecting images from a set of input images;
 - 5 (ii) selecting transformation functions from a set of transformation functions;
 - (iii) generating transformed images by applying the selected transformation functions to the selected images; and
 - (iv) generating an output image by combining the transformed images.
- 10 2. A fractal generation process as claimed in claim 1, including:
 - (v) repeating steps (i) to (iv) to generate a set of output images; and
 - (vi) repeating steps (i) to (v) using said set of output images as said set of input images to generate a new set of output images.
- 15 3. A fractal generation process as claimed in claim 2, including repeating step (vi) until said new set of output images is substantially independent of the first set of input images used in the process.
4. A fractal generation process as claimed in claim 1, wherein the number of selected
20 transformation functions is less than the number of transformation functions in said set of transformation functions.
5. A fractal generation process as claimed in claim 1, wherein the step of selecting transformation functions includes selecting an iterated function system from a set of
25 iterated function systems, each iterated function system including a set of transformation functions.
6. A fractal generation process as claimed in claim 5, wherein the selection of an iterated
30 function system is based on selection probabilities associated with said iterated function systems.

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7. A fractal generation process as claimed in claim 1, wherein the combining of said transformed images includes superimposing said transformed images.
8. A fractal generation process as claimed in claim 1, wherein said transformation
5 functions include geometrical transformations.
9. A fractal generation process as claimed in claim 8, wherein said geometrical transformations include scaling and translation.
- 10 10. A fractal generation process as claimed in claim 8, wherein said geometrical transformations include scaling, translation and geometrical distortion.
11. A fractal generation process as claimed in claim 1, wherein said geometrical transformations are contractive transformations.
- 15 12. A fractal generation process as claimed in claim 1, wherein said transformation functions include projective transformations.
13. A fractal generation process as claimed in claim 1, wherein said transformation
20 functions include transformations of at least one of brightness and colour.
14. A fractal generation process as claimed in claim 1, wherein each of said transformation functions is represented by one or more parameters.
- 25 15. A fractal generation process as claimed in claim 1, including generating said transformation functions and said selection probabilities.
16. A fractal generation process as claimed in claim 15, wherein said transformation functions and said selection probabilities are generated on the basis of one or more
30 predetermined probability distributions.

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17. A fractal generation process as claimed in claim 1, including generating said set of input images.

18. A fractal generation process, including randomly selecting from a set of input images, transforming the selected images, and combining the transformed images to generate a set of output images, and iterative repetition of these steps using the set of output images of each iteration as the set of input images for the next iteration.

19. A fractal generation process as claimed in claim 18, wherein said selecting includes selecting the same input image more than once.

20. A fractal generation process as claimed in claim 18, wherein said transforming includes scaling and translating the selected images.

21. A fractal generation process as claimed in claim 20, wherein said transforming also includes geometrically distorting the selected images.

22. A fractal generation process as claimed in claim 18, wherein the transforming is contractive.

23. A system having components for executing the steps of any one of claims 1 to 22.

24. A computer readable storage medium having stored thereon program code for executing the steps of any one of claims 1 to 22.

25. Image data generated by a process as claimed in any one of claims 1 to 22.

26. Image data as claimed in claim 25, wherein said image data represents one or more V-variable fractals.

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27. A fractal generator, including:

an image selector for selecting M images from V input images;

a function selector for selecting a set of M transformation functions;

at least one image transformer for respectively applying the selected transformation

5 functions to the selected input images; and

a compositor for composing an output image from the images output by said at least one image transformer.

28. A fractal generator as claimed in claim 27, including a set of V image buffers for
10 storing the input images.

29. A fractal generator as claimed in claim 27, wherein said function selector is adapted to select said set of M transformation functions from N sets of transformation functions.

15 30. A fractal generation system, including an image selector for selecting images from a set of input images, and an image transformer for transforming the selected images to generate a set of output images, said system being adapted to provide said set of output images as the set of input images to iteratively generate fractal image data.

20 31. A fractal generation system as claimed in claim 30, wherein said image transformer includes one or more image transformation modules for transforming said selected images, and an image combination module for combining the transformed images.

25 32. A fractal generation system as claimed in claim 31, wherein said one or more image transformation modules are adapted to scale and translate said selected images.

33. A fractal generation system as claimed in claim 32, wherein said one or more image transformation modules are adapted to geometrically distort said selected images.

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34. A fractal generation system as claimed in claim 30, including a transformation selection module to select transformations to be applied to the selected images from a set of transformations.

5 35. A fractal generation system as claimed in claim 34, wherein said transformation selection module is adapted to select transformations based on selection probabilities associated with said set of transformations.

10 36. Fractal image data representing a combination of two or more constituent first images, each of said first images representing a random transformed combination of two or more constituent second images, each of said second images representing a random transformed combination of two or more constituent third images, each of said third images representing a random transformed combination of two or more constituent fourth images, wherein each transformation includes at least one of translation and
15 rotation.

37. Fractal image data as claimed in claim 36, wherein each transformation is a projective transformation, such as an affine transformation.

20 38. Fractal image data as claimed in claim 37, wherein each transformation includes contractive scaling.

39. Fractal image data as claimed in claim 37, wherein the transformations are contractive on average.

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40. Fractal image data as claimed in claim 36, wherein each combination is a superposition.

30 41. Image data representing a variable number n of constituent images iteratively transformed and combined in a random manner to generate said image data, with $1 < n \leq V$.

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42. Image data as claimed in claim 41, wherein the constituent images are transformed using projective transformations at each iteration.

5 43. A V-variable fractal.

44. A V-variable fractal as claimed in claim 43, wherein said V-variable fractal is represented by fractal image data, where V is an integer greater than one and represents the number of constituent images available for iterative combination to generate the
10 fractal.

45. Image data decomposable into at least four successive levels, wherein each level is composed of smaller data sets which are affine transformations of V basic sets.

15 46. Image data as claimed in claim 45, wherein the basic sets vary from level to level.

47. Image data as claimed in claim 45, wherein the transformations are contractive.

48. Image data as claimed in claim 45, wherein said image data generated at each iteration
20 comprises a set of $V > 1$ images.

49. Image data representing iterative transformation and combination of at least two images selected from a set of $V > 1$ input images, wherein image data generated at each iteration represents a combination of at least two smaller images, wherein each of said
25 at least two smaller images represents an affine or projective transformation of image data generated at the previous iteration.